FORM PTO-1390 (REV 12-29-99) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	US APPLICATION NO (If known, see 37 CFR 1.5)
6009-4591	09/623882

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/FI99/00258	March 29, 1999	March 30, 1998

TITLE OF INVENTION
APPARATUS FOR REMOVING MATERIAL FROM PRESSURISED SPACE

APPLICANT(S) FOR DO/EO/US Jaakko VILO of Turku, Finland

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [X] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] has been transmitted by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [ ] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [ ] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
    [ ] A SECOND or SUBSEQUENT preliminary amendment.
14. [ ] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [X] Other items or information:
    1. Form PCT/IB/308 - Notice of Communication of International Application to Designated Offices;
    2. Form PCT/RO/101 - PCTVRequest;
    3. Form PCT/IPEA/409 - International Preliminary Examination Report;
    4. International Application with International Search Report

422 Rec'd PCT/PTO 11 SEP 2000

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/623882	PCT/FI99/00258	6009-4591

17. [X] The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$970.00**

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$840.00**

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$690.00**

International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$670.00**

International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) **$96.00**

	CALCULATIONS PTO USE ONLY	
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 970.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	10 - 20 =	0	X **$18.00**	$ 0.00	
Independent claims	1 - 3 =	0	X **$78.00**	$ 0.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ **$260.00**	$ 260.00	
TOTAL OF ABOVE CALCULATIONS =				$1230.00	
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also by filed (Note 37 CFR 1.9, 1.27, 1.28).				$	
SUBTOTAL =				$1230.00	
Processing fee of **$130.00** for furnishing the English translation later than [ ]20 [ ]30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$	
TOTAL NATIONAL FEE =				$1230.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +				$	
TOTAL FEES ENCLOSED =				$ 1230.00	
				Amount to be refunded:	$
				charged:	$

a. [X] A check in the amount of $ 1230.00 to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. _____. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

MORGAN & FINNEGAN, L.L.P.
345 Park Avenue
New York, NY 10154-0053

SIGNATURE

Harold Haidt

NAME

17,509

REGISTRATION NUMBER

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re New Application of	)	
	)	
JAAKKO VILO	)	Application Division
	)	
Serial No.	)	
	)	
Filed: September 11, 2000	)	
	)	
For: APPARATUS FOR REMOVING MATERIAL FROM PRESSURISED SPACE	)	

Box PCT - Attention: DO/EO/US
Commissioner of Patents
Washington, D. C. 20231

PRELIMINARY AMENDMENT

Sir:

Before calculation of the filing fee and examination of the above-identified application, please amend the above-noted application as follows:

In The Claims:

Claim 7, line 1, strike "any of the preceding claims" and insert --claim 1 or claim 2--.

REMARKS

Claim 7 has been modified to make the claim properly

multiply dependent and to reduce the total number of claims.

Respectfully submitted,

For Applicant

By 

Harold Haidt
Reg. No. 17,509

September 11, 2000

MORGAN & FINNEGAN, L.L.P.
345 Park Avenue
New York, NY 10154-0053
(212) 758-4800

(6009-4591)

APPARATUS FOR REMOVING MATERIAL FROM PRESSURISED SPACE

The present invention relates to an apparatus for removing solid materials, and particularly to an apparatus for removing finely divided solids from a pressurised space to which there are connected members for feeding the material to be treated into a process taking place in a pressurised space and for removing the created products from said pressurised space.

From a pressurised space, material is usually removed so that the pressure in said space is reduced, and the material outlet is opened for removing the material from the space. When the pressure is desired to be maintained in said space, there is installed in connection with the material outlet, a valve or valves whereby the material can be removed from the space without essentially altering the pressure. The employed valves can be either electric, hydraulic or pneumatic, in which case the material usually causes a pressure to the valve flap. When the pressure surpasses a given limit, the valve is opened, and the material is discharged from the space. When the amount of discharged material rises to a level where the pressure caused by said material is sufficiently reduced, the valve is closed. This kind of valve can be for example an eccentric flap valve, where the pressure is located on the other side of the valve flap. However, the valve is not suited for finely divided solids, because in connection with the closing of the valve, in between the valve flap and the valve housing, there remain solid particles that reduce the compactness of the sealing achieved by the valve and finally make the valve unfit for use.

Pneumatically sealed valves are also used for removing material from a pressurised space. A pneumatically sealed calotte valve has a uniform pneumatic sealing, but otherwise the structure corresponds in principle to a spherical valve, in which case the drawbacks are a large size and a high price. Known pneumatically sealed flap valves are in form symmetric in relation to the

axis, in which case the drawback is their sealing at the axis. This type of valve arrangement is also easily blocked.

From the FI patent 68,977 there is known a filter device that with gearing and actuator is used in an over pressure space, and the filtering products thereof, i.e. the finely divided solids, are removed through a lock gate from the over pressure space. The employed lock gate is for instance a blade lock or a spiral conveyor, in which case the solids flow is utilised in the operation of the lock gate. Now the finely divided solids to be removed can to a certain extent be prevented from getting in between the locking member of the lock gate and the wall, because the lock gate as such does not perform a motion opposite to the circulation direction of the solids, but the solids always flow to the same direction. However, the operation of this kind of a lock gate is dependent on the solids flow, because the solids flow as such maintains the compactness achieved by means of the lock gate as the position of the blades alters, in order to maintain the over pressure in the over pressure space.

The US patent 5,362,403 specifies a filtering device and method for removing the filter cake from the filtering part of the filtering device. In said method, the filter cake is transferred by a spiral conveyor to a discharge shaft. In the bottom part of said discharge shaft, there is installed a locking member which is hydraulically controlled. According to the US patent 5,362,403, the locking member together with the discharge shaft forms a pressure lock in between the filtering device and normal air pressure. The operation of the locking member is controlled by two electrodes attached to the discharge shaft, so that when the filter cake has reached a certain height in the discharge shaft, the filter cake creates an electric lock in between the electrodes, the control member opens the locking member and the filter cake is discharged through the discharge shaft. The removal of the filter cake is thus carried out in a discontinuous way, and in connection with the removal, it is possible that the pressure is reduced in the filtering device proper, too.

The object of the present invention is to eliminate some of the drawbacks of the prior art and to achieve an improved apparatus with a simpler structure and a lower price for removing filtered material from pressurised space, said apparatus functioning automatically according to operating pressure and material flow. The essential novel features of the invention are apparent from the appended claims.

According to the invention, the conveyor transfers in a pressurised space filtered material obtained from the filter to a discharge conduit, from where the filtered material is transferred to normal air pressure via an adjusting member located at the opposite end. By means of said adjusting member, the surface height of the filtered material in the discharge conduit is maintained essentially on the same level on a substantially continuous basis. When the surface height in the discharge conduit surpasses a predetermined value, the aperture of the adjusting member is increased. Thus the flow speed of the filtered material increases, and the surface height in the discharge conduit is reduced to a desired, predetermined value. Respectively, when the surface height falls under a predetermined value, the aperture of the adjusting member is diminished in order to return the surface height to the desired, predetermined value.

In the apparatus according to the invention, the adjusting member installed in the discharge conduit includes at least two at least partially overlapping adjusting elements, which are provided with ports for letting the filtered material flow through the adjusting member. The total area of said ports falls within the range of 5 - 20 %, advantageously 10 - 15 % of the total area of the adjusting element. Moreover, in relation to each other the adjusting elements are arranged so that at least one of the adjusting elements can be moved. When the adjusting elements are moved with respect to each other, the ports provided in different elements can be matched, at least in a partly overlapping fashion, so that through said ports, the filtered material can be made to flow

from the discharge conduit to normal air pressure. Respectively, when the adjusting elements are moved in relation to each other so that the ports in the separate adjusting elements are not matched, the flowing of the filtered material is prevented.

According to the invention, in order to move the separate adjusting elements of the adjusting member in relation to each other, at least one of the adjusting elements is connected to a moving member. Said moving member is operated pneumatically, hydraulically or electrically. Depending on the mode of operation of the moving member, the adjusting member can be connected to the moving member either directly or via a separate transmission member. The employed transmission member can be for instance a lever arm or a piston, or said transmission member can be made of several parts, in which case it comprises for example a servo valve, a pneumatic cylinder and a lever arm.

In the apparatus according to the invention, the operation of the adjusting member is controlled by a control member which measures the surface height of the filtered material in the discharge conduit. Preferably the measuring is carried out by means of a measuring sensor installed outside the discharge conduit. Advantageously the measurement takes place by means of ultrasound, for instance, or then the change caused by the filtered material in the support structure of the discharge conduit is utilised in the measurement.

When using ultrasound, at least one ultrasonic sensor is employed for measuring in an essentially continuous fashion the surface height of the filtered material contained in the discharge conduit. In the control unit of the apparatus according to the invention, the obtained result is compared with the desired, predetermined surface height value. If the measuring result differs from said predetermined value, the control unit controls the adjusting member moving member, so that the surface height is returned to the desired, predetermined value.

When applying the strength change caused by the material in the supporting structure of the discharge conduit while measuring the filtered material surface height, outside the discharge conduit, in connection with the measuring sensor, there is installed at least one actuator whereby the strain caused by the filtered material in the supporting structure of the discharge conduit can be measured. Said actuator can be for example a bellows member made of some elastic material, so that on the basis of the elastic shortening of said bellows member, the change caused by the filtered material in the supporting structure of the discharge conduit can be determined. As an alternative, said actuator can be a tension-measuring member which determines the tension caused in the supporting structure by the filtered material. In the control unit of the apparatus of the invention, the obtained measuring result of the change in the support structure is compared, in the same fashion as when using ultrasound, with the predetermined supporting structure change caused by the desired surface height. On the basis of said comparison, the control unit controls the adjusting member, so that the surface height is returned to the desired value.

When using the apparatus according to the invention, by keeping the surface height of the filtered material essentially continuously on a desired, predetermined level, the filtered material serves as a pressure lock. Moreover, the filtered material and the pressure contained inside the filtering device direct a pressure force to the adjusting elements of the adjusting member, so that the adjusting elements are pressed against each other. When the surfaces of the adjusting elements that are nearest to each other are advantageously essentially smooth, the pressure force presses said adjusting elements together in an essentially compact fashion, in which case the pressure leak taking place via the adjusting member is as small as possible.

The invention is explained in more detail below, with reference to the appended drawing, wherein

figure 1 shows a preferred embodiment of the invention in a schematical side-view illustration,

figure 2 shows another preferred embodiment of the invention in a schematical side-view illustration,

figure 3 is a top-view illustration of an adjusting element according to the invention, and

figure 4 is a top-view illustration of an another adjusting element according to the invention.

According to figures 1 and 3, a conveyor 2 installed inside a pressurised filter 1 conveys material 11 filtered in a filter 1 to a discharge conduit 3. To the discharge conduit 3, to its filtered material discharge end, there is attached an adjusting member 4. The adjusting member 4 includes two concentric elements 5 and 6 which are provided with ports 7. In relation to each other, said adjusting elements 5 and 6 are advantageously installed, so that one adjusting element 5 is installed permanently, whereas the other adjusting element 6 is installed movably with respect to the axis 8. In order to move the adjusting element 6, said element 6 is connected to a control unit 12 by intermediation of a lever arm 9, a pneumatic cylinder 14 and a servo valve 13.

While the adjusting member 3 is in operation, in the immediate vicinity of the discharge conduit 3, there is installed an ultrasonic sensor 10, which measures, in an essentially continuous manner, the surface height 15 of the filtered material 11 contained in the discharge conduit. In the control unit 12 of the apparatus, the measuring result obtained from the ultrasonic sensor 10 is compared with the desired, predetermined value. If the measuring result differs from the predetermined value, the control unit 12 operates a servo valve 13, which further controls the pneumatic cylinder 14 connected to the lever arm 9 in order to move the adjusting element 6 in relation to the adjusting element 5, so that the surface height of the filtered material 11 in the discharge conduit 3 is returned to the desired, predetermined value.

According to figure 2, in the discharge conduit 21, there are attached shoulders 22 that support the discharge conduit 21. In between said shoulders 22 and the support surface 23, there are installed actuators 24, i.e. bellows members made of some elastic material, which members receive the changes caused by the filtered material in the pressure of the discharge conduit 21. The change received by the bellows members 24 is measured by means of a force measuring sensor 25. In the control unit 26, the measuring result given by the force measuring sensor 25 is compared with the change causing the desired, predetermined value of the surface height. If the measuring result differs from the desired value, the adjusting member 27 provided in the bottom part of the discharge conduit 21 is manipulated, so that in the discharge conduit 21, there can be maintained the desired surface height of the filtered material. Accordingly, if the surface height level 28 surpasses the desired, predetermined value, the adjusting elements 29 and 30 of the adjusting member 27, provided with ports, are moved in relation to each other, so that from the discharge conduit 21, there is discharged filtered material through the adjusting elements 29 and 30 to further processing. Said adjusting elements 29 and 30 are installed concentrically with respect to the axis 31, so that at least one of the adjusting elements 29 and 30 can be moved in relation to the axis 31. To the axis 31, there is connected a lever arm 32, whereby the adjusting element or elements 29 and 30 are moved in order to create an advantageous material flow from the discharge conduit 21 to outside it.

Figure 4 illustrates an advantageous manner for locating the ports 33 in the adjusting elements 29 and 30.

CLAIMS

1. An apparatus for removing filtered material from a pressurised filter space, in which filter space there are installed members for feeding the material to be processed into filtering that takes place in a pressurised space, as well as members for removing the filtering product, i.e. the filtered material, from the pressurised filter space, **characterised** in that in the discharge conduit (3,21) of the filter space, at the material discharge end, there is connected an adjusting member (4,27), said adjusting member (4,27) comprising at least two adjusting elements (5,6;29,30) which are installed concentrically (8,31) in relation to each other and are provided with ports (7,33) and are movable in relation to each other, for maintaining the measurable surface height (11,28) of the filtered material contained in the discharge conduit (3,21) essentially at a predetermined value in a substantially continuous fashion.

2. An apparatus according to claim 1, **characterised** in that at least one of the adjusting elements (6,30) is installed movably around the axis (8,31).

3. An apparatus according to the claims 1 or 2, **characterised** in that in order to measure the surface height (11) of the filtered material, the discharge conduit (3) is provided with an ultrasonic sensor (10).

4. An apparatus according to the claims 1 or 2, **characterised** in that in order to measure the surface height (28) of the filtered material, in the discharge conduit (21) there is installed an actuator that measures the changes in the discharge conduit supporting structure (22).

5. An apparatus according to claim 4, **characterised** in that the actuator measuring the change of the discharge conduit supporting structure (22) is a force measuring sensor (25).

6. An apparatus according to claim 4, **characterised** in that the actuator measuring the change of the discharge conduit supporting structure (22) is a tension measuring sensor.

7. An apparatus according to any of the preceding claims, **characterised** in that the measuring of the filtered material surface height (10,25) and the member (15,31) for moving the adjusting element are interconnected electrically (12,26).

(57) ABSTRACT

The invention relates to an apparatus for removing filtered material from a pressurised filter space, in which filter space there are installed members for feeding the material to be processed to filtering carried out in a pressurised space, as well members for removing the product, i.e. the filtered material created in the process, from the pressurised filter space. According to the invention, in the material discharge end of the discharge conduit (3,21) of the filtering space, there is connected an adjusting member (4,27), said adjusting member (4,27) comprising at least two adjusting elements (5,6;29,30) which are provided with ports (7,33) and are movable in relation to each other, in order to maintain the measurable filtered material surface height (11,28) in the discharge conduit (3,21) essentially at a predetermined value in a substantially continuous fashion.

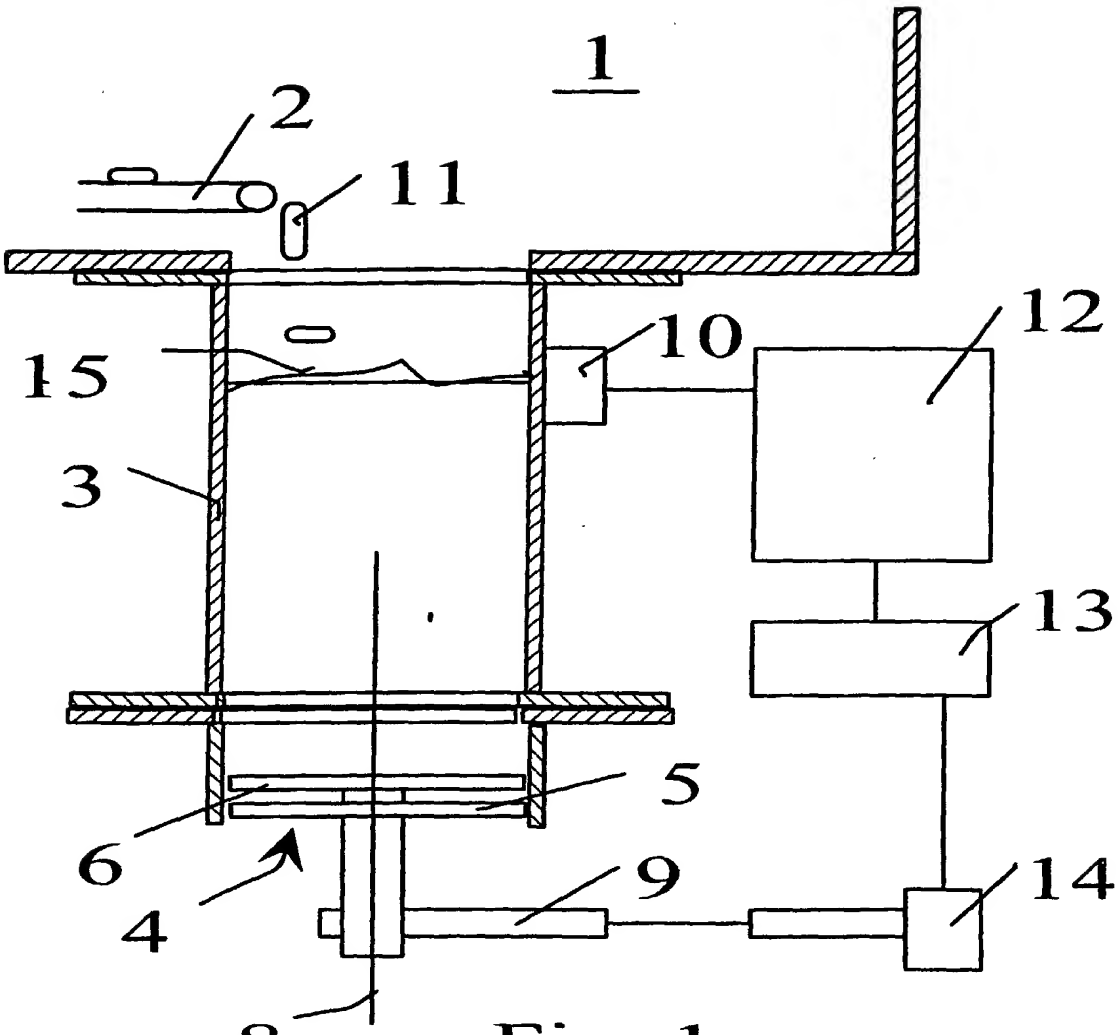

Fig. 1

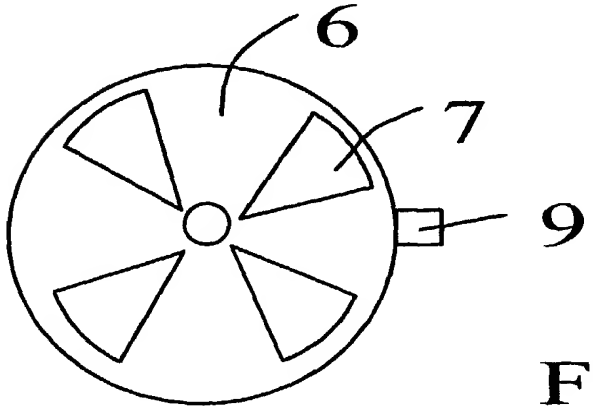

Fig. 3

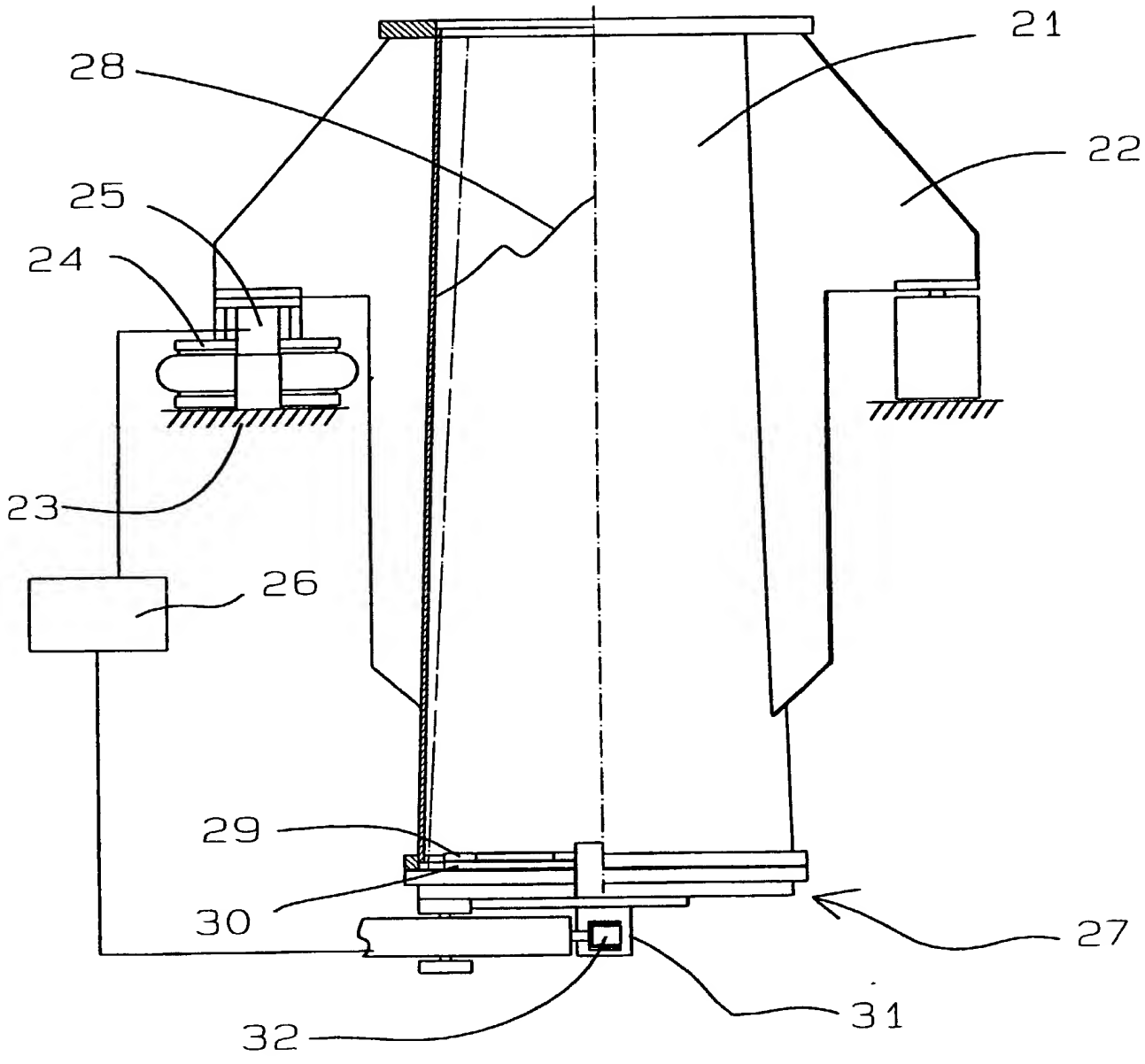

Fig. 2

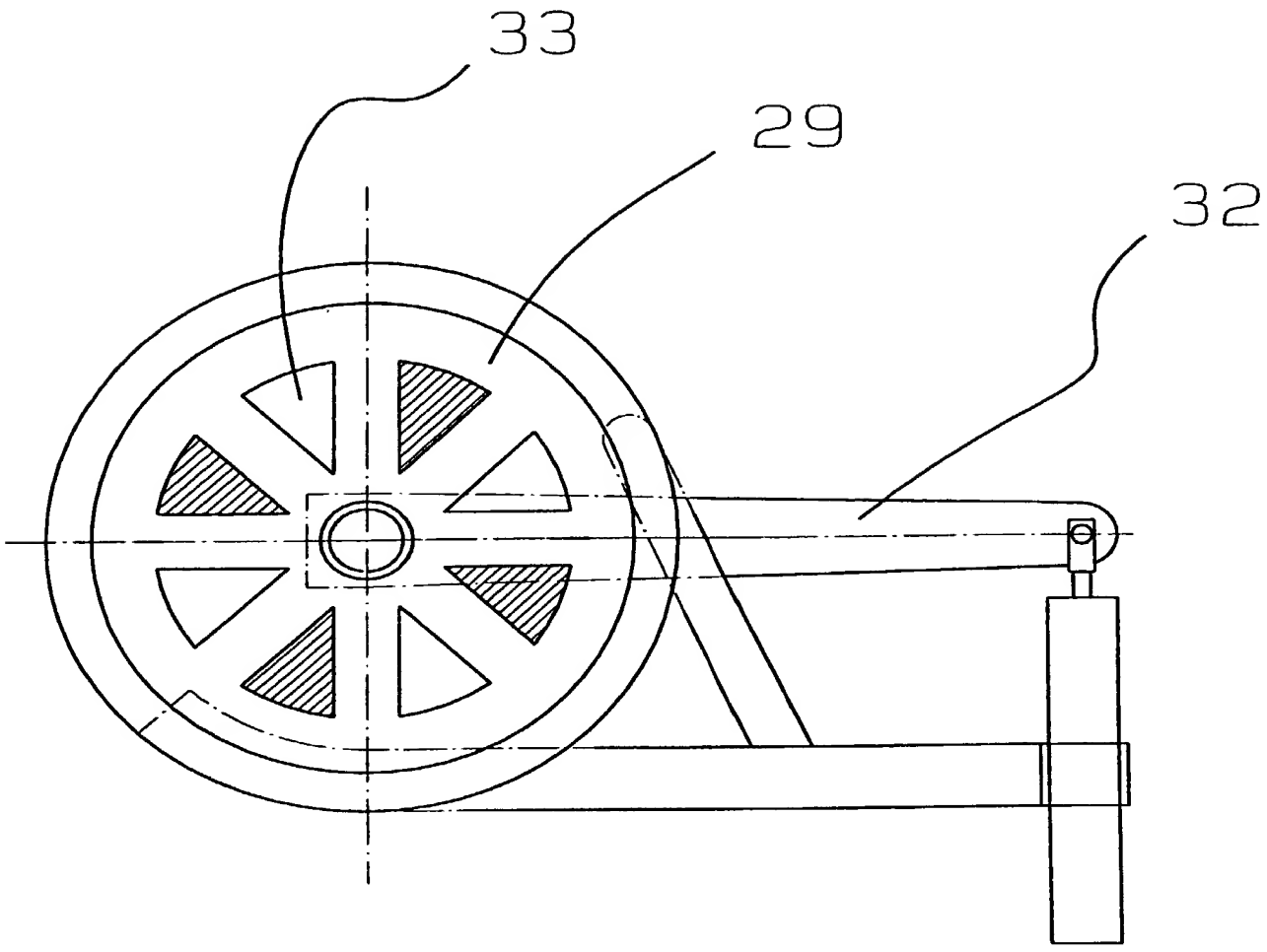

Fig. 4

09/622361 28073 05

Docket No. _____

COMBINED DECLARATION AND POWER OF ATTORNEY FOR ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL DIVISIONAL, CONTINUATION OR CONTINUATION-IN-PART APPLICATION

As a below name inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Apparatus for removing material from pressurised space

the specification of which

a. [ ] **is attached hereto**

b. [ ] **was filed on** _____ **as application Serial No.** _____ **and was amended on** _____. **(if applicable).**

PCT FILED APPLICATION ENTERING NATIONAL STATE

c. [X] **was described and claimed in International Application No.** PCT/FI99/00258 **filed on** 29 March 1999 **and as amended on** _____. **(if any).**

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

I hereby specify the following as the correspondence address to which all communications about this application are to be directed:

SEND CORRESPONDENCE TO: MORGAN & FINNEGAN, L.L.P
345 Park Avenue
New York, N.Y. 10154

DIRECT TELEPHONE CALLS TO: _____
(212) 758-4800

[ ] **I hereby claim foreign priority benefits under Title 35, United States Code § 119(a)-(d) or under § 365(b) of any foreign application(s) for patent or inventor's certificate or under § 365(a) of any PCT international application(s) designating at least one country other than the U.S. listed below and also have identified below such foreign application(s) for patent or inventor's certificate or such PCT international application(s) filed by me on the same subject matter having a filing date within twelve (12) months before that of the application on which priority is claimed:**

[ ] **The attached 35 U.S.C. § 119 claim for priority for the application(s) listed below forms a part of this declaration.**

Country/PCT	Application Number	Date of filing (day, month, yr)	Date of Issue (day, month, yr)	Priority Claimed
Finland	19980713	30/03/1998		[X] YES [ ] NO
				[ ] YES [ ] NO
				[ ] YES [ ] NO

[ ] I hereby claim the benefit under 35 U.S.C. § 119(e) of any U.S. provisional application(s) listed below.

Provisional Application No.	Date of Filing (day, month, yr)

ADDITIONAL STATEMENTS FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN-PART OR PCT INTERNATIONAL APPLICATION(S) (DESIGNATING THE U.S.)

I hereby claim the benefit under Title 35, United States Code § 120 of any United States application(s) or under § 365(c) of any PCT international application(s) designating the U.S. listed below.

US/PCT Application Serial No.	Filing Date	Status (patented, pending, abandoned)/ U.S. application no. assigned (For PCT)
US/PCT Application Serial No.	Filing Date	Status (patented, pending, abandoned)/ U.S. application no. assigned (For PCT)

[ ] In this continuation-in-part application, insofar as the subject matter of any of the claims of this application is not disclosed in the above listed prior United States or PCT international application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or Imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint the following attorneys and/or agents with full power of substitution and revocation, to prosecute this application, to receive the patent, and to transact all business in the Patent and Trademark Office connected therewith: John A. Diaz (Reg. No. 19,550), John C. Vassil (Reg. No. ~~19,098~~), Alfred P. Ewert (Reg. No. ~~19,887~~), David H. Pfeffer (Reg. No. 19,825), Harry C. Marcus (Reg. No. 22,390), Robert E. Paulson (Reg. No. 21,046), Stephen R. Smith (Reg. No. 22,615), Kurt E. Richter (Reg. No. 24,052), J. Robert Dailey (Reg. No. ~~27,434~~), Eugene Moroz (Reg. No. 25,237), John F. Sweeney (Reg. No. 27,471), Arnold I. Rady (Reg. No. 26,601), Christopher A.

Hughes (Reg. No. 26,914), William S. Feiler (Reg. No. 26,728), Joseph A. Calvaruso (Reg. No. 28,287), James W. Gould (Reg. No. 28,859), Richard C. Komson (Reg. No. 27,913), Israel Blum (Reg. No. 26,710), Bartholomew Verdirame (Reg. No. 28,483), Maria C.H. Lin (reg. No. 29,323), Joseph A. DeGirolamo (Reg. No. 28,595), Michael A. Nicodema (Reg. No. 33,199), Michael P. Dougherty (Reg. No. 32,730), Seth J. Atlas (Reg. No. 32,454), Andrew M. Riddles (Reg. No. 31,657), Bruce D. DeRenzi (Reg. No. 33,676), Michael M. Murray (Reg. No. 32,537), Mark J. Abate (Reg. No. 32,527), Alfred L. Haffner, Jr. (Reg. No. 18,919), Harold Haidt (Reg. No. 17,509), John T. Gallagher (Reg. No. 35,516), Steven F. Meyer (Reg. No. 35,613) and Kenneth H. Sonnenfeld (Reg. No. 33,285) of Morgan & Finnegan, L.L.P. whose address is: 345 Park Avenue, New York, New York, 10154; and Edward A. Pennington (Reg. No. 32,588), Michael S. Marcus (Reg. No. 31,727) and John E. Hoel (Reg. No. 26,279) of Morgan & Finnegan, L.L.P., whose address is 1775 Eye Street, Suite 400, Washington, D.C. 20006.

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[ ] I hereby authorize the U.S. attorneys and/or agents named hereinabove to accept and follow instructions from Outokumpu Oyj as to any action to be taken in the U.S. Patent and Trademark Office regarding this application without direct communication between the U.S. attorneys and/or agents and me. In the event of a change in the person(s) from whom instructions may be taken I will so notify the U.S. attorneys and/or agents hereinabove.

Full name of sole or first inventor Vilo, Jaakko

Inventor's signature* Jaakko Vilo 9th October 2000
date

Residence Haperotie 2, Nastola, Finland

Citizenship Finnish FIX

Post Office Address Haperotie 2, FIN-15550 Nastola, Finland

Full name of second joint inventor, if any _____

Inventor's signature* _____
date

Residence _____

Citizenship _____

Post Office Address _____

[ ] ATTACHED IS ADDED PAGE TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR SIGNATURE BY THIRD AND SUBSEQUENT INVENTORS FORM.

* Before signing this declaration, each person signing must:

1. Review the declaration and verify the correctness of all information therein; and

2. Review the specification and the claims, including any amendments made to the claims.

After the declaration is signed, the specification and claims are not to be altered.

To the inventor(s):

The following are cited in or pertinent to the declaration attached to the accompanying application:

Title 37, Code of Federal Regulation, § 1.56

Duty to disclose information material to patentability.

(a) A patent by its very nature is affect with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in patent was cited by the Office or submitted to the Office in the manner prescribed by §§1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

Title 35, U.S. Code § 101

Inventions patentable

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Title 35 U.S. Code § 102

Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent,

(b) the invention was patented or described in a printed publication in this or foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate field more than twelve months before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent, or

(f) he did not himself invent the subject matter sought to be patented, or

(g) before the applicant's invention thereof the invention was made in this country by another had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other ...

Title 35, U.S. Code § 103

Conditions for patentability; non-obvious subject matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Title 35, U.S. Code § 112 (in part)

Specification

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise and exact terms also enable any person skilled in the art to which it pertains, or with which it is mostly nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Title 35, U.S. Code § 119

Benefit of earlier filing date in foreign country; right of priority

An application for patent for an invention filed in this country by any person who has, or whose legal representatives or assigns have, previously regularly filed an application for a patent for the same invention in a foreign country which affords similar privileges in the case of applications filed in the United States or to citizens of the United States, shall have the same effect as the same application would have if filed in this country on the date on which the application for patent for the same invention was first filed in such foreign country, if the application in

this country is filed within twelve months from the earliest date on which such foreign application was filed; but no patent shall be granted on any application for patent for an invention which had been patented or described in a printed publication in any country more than one year before the date of he actual filing of the application in this country, or which had been in public use or on sale in this country more than one year prior to such filing.

Title 35, U.S. Code § 120

Benefit or earlier filing date in the United States

An application for patent for an invention disclosed in the manner provided by the first paragraph of section 112 of this title in an application previously filed in the United States, or as provided by section 363 of this title, which is filed by an inventor or inventors named in the previously filed application shall have the same effect, as to such invention, as though filed on the date of the prior application, if filed before the patenting or abandonment of or termination of proceedings on the first application or an application similarly entitled to the benefit of the filing date of the first application and if it contains or is amended to contain a specific reference to the earlier filed application.

Please read carefully before signing the Declaration attached to the accompanying Application.

If you have any questions, please contact Morgan & Finnegan, L.L.P.

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